


CASE STUDY - Baking

TASK TITLE: Baking

Task Description:	<p>The Baking task involves the preparation of baked foods such as breads, cakes, pies and pastries. This includes moving boxes and bins of ingredients, mixing ingredients in large mixing bowls and moving pans to and from the ovens. Cooking (Food Preparation) and Cooking (Short-order Grill) are addressed in other case studies in this Guide.</p> <p>Typical examples in which the Baking tasks can occur include (but are not limited to) are:</p> <ul style="list-style-type: none">• Cafeterias and mess halls• Restaurants• Clubs
Job Performance Measures Most Often Impacted by Baking:	<p>Measures of work performance can include (but are not necessarily limited to):</p> <ul style="list-style-type: none">• Hours daily to complete Baking tasks• Taste of food
Typical Employee Comments about Baking:	<p>Employees typically experience discomfort in the legs/feet and lower back. They generally attribute this discomfort to a combination of standing on hard surfaces and lifting heavy bowls.</p> <p>The back/torso is the body area that most commonly receives a “High” priority rating. The remaining body areas, with the exception of the head/eyes, are more likely to receive a “Medium” priority rating, or lower.</p>
Suggested Level II Analysis:	Dynamic Task Analysis, Biomechanical Lifting Analysis, Push/Pull Analysis

Shoulder/Neck

Job Factor	Potential Causes	Corrective Action	Level of Changes		Cost	Impact On	
			✓ Minor Modification	✓ Major Change		Quality	Productivity
1. Reaching	<ul style="list-style-type: none"> Work area too high 	32. Lower the work piece/work surface <ul style="list-style-type: none"> position ingredient prep work near or just above elbow level use an adjustable height table provide height adjustable mixing bowls provide several alternate work height prep tables 	✓		low	med	med
	<ul style="list-style-type: none"> Items stored too high 	123. Raise the person <ul style="list-style-type: none"> provide a portable work platform which can be easily stored under the table, out of the way 		✓	med to high	low	low
		123. Raise the person <ul style="list-style-type: none"> provide a footstool or small step 	✓		low	low	low

Shoulder/Neck (Cont'd)

Job Factor	Potential Causes	Corrective Action	Level of Changes		Cost	Impact On	
			✓ Minor Modification	✓ Major Change		Quality	Productivity
	• Items stored too high (cont'd)	32. Lower the work piece/work surface					
		• place frequently accessed and/or heavy ingredients on shelves between mid-thigh and chest height	✓		low	low	med
		13. Encourage ergonomic work techniques					
	• Work too far away	• avoid stacking baking trays above shoulder height in cart racks	✓		low	low	low
		41. Move work piece closer to body	✓		low	low	low
		• slide the work closer before lifting					
	• Too many supplies on workstation	149. Provide appropriate tools	✓		med	low	low
		• provide a rake-type tool to grasp containers					
		41. Move work piece closer to body	✓		low	low	low
		• place frequently used items with easy reach		✓	med	med	med
		• modify storage containers to reduce reach requirements		✓	med to high	med	med
		• provide dispensing mechanisms for ingredients					

Shoulder/Neck (Cont'd)

Job Factor	Potential Causes	Corrective Action	Level of Changes		Cost	Impact On	
			✓ Minor Modification	✓ Major Change		Quality	Productivity
	<ul style="list-style-type: none"> Reaching into oven to place/remove items in back 	148. Provide appropriate equipment <ul style="list-style-type: none"> install an oven with a vertical or horizontal rotisserie/carousel in order to minimize reaching and bending 		✓	high	low	med
2. Arm forces: Repeated arm forces or holding/ carrying materials	<ul style="list-style-type: none"> Carrying stacks of pans and ingredient cases 	48. Provide a cart <ul style="list-style-type: none"> use existing carts provide sufficient number of carts to insure availability 	✓	✓	low med	low low	low med
		4. Change a lifting/carrying task into a rolling or sliding tasks <ul style="list-style-type: none"> provide carts which can be adjusted to bench, shelf and oven heights to minimize lifting 		✓	med	med	high
	<ul style="list-style-type: none"> Rolling/sliding resistance of cart or piece of equipment causes high forces 	35. Maintain tracks, rollers, and movement mechanisms <ul style="list-style-type: none"> repair wheels on carts or equipment install appropriate wheels; select larger wheels for the tile floors. 	✓		med	med	med
			✓		med	med	med
	<ul style="list-style-type: none"> Freezer door is difficult to open 	11. Eliminate unnecessary tasks <ul style="list-style-type: none"> replace freezer door with an air curtain 		✓	high	low	med


Shoulder/Neck (Cont'd)

Job Factor	Potential Causes	Corrective Action	Level of Changes		Cost	Impact On	
			✓ Minor Modification	✓ Major Change		Quality	Productivity
	<ul style="list-style-type: none"> Freezer door is difficult to open (continued) Floor/surface condition causes high forces during a rolling or sliding task 	35. Maintain tracks, rollers, and movement mechanisms	✓		med	low	med
		<ul style="list-style-type: none"> perform routine lubrication and maintenance on the freezer door to limit force requirements lubricate door hinges 	✓		low	low	med
		17. Improve floor condition	✓		low	med	med
		<ul style="list-style-type: none"> improve housekeeping repair cracks or gaps in floor provide ramps to compensate for minor differences in floor height 	✓	✓	high med	med med med	med med med
3. High speed, sudden shoulder movements	<ul style="list-style-type: none"> Speed of lift 	13. Encourage ergonomic work techniques	✓		low	low	low
		128. Reduce force required to install or remove component <ul style="list-style-type: none"> approach vendor regarding means for reducing object weight 		✓	med	med	med

Shoulder/Neck (Cont'd)

Job Factor	Potential Causes	Corrective Action	Level of Changes		Cost	Impact On	
			✓ Minor Modification	✓ Major Change		Quality	Productivity
	<ul style="list-style-type: none"> Freezer door is difficult to open 	35. Maintain tracks, rollers, and movement mechanisms <ul style="list-style-type: none"> perform routine lubrication and maintenance on the freezer door to limit force requirements lubricate door hinges 11. Eliminate unnecessary tasks <ul style="list-style-type: none"> replace freezer door with an air curtain 	✓ ✓	✓	med low high	low low low	med med med
4. Head/neck bent or twisted	<ul style="list-style-type: none"> Location of work too low 	20. Incorporate rest pauses 124. Raise the work piece/work surface <ul style="list-style-type: none"> provide a riser or block to raise work surface 	✓ ✓		low low	low high	med high

Hands/Wrists/Arms

Job Factor	Potential Causes	Corrective Action	Level of Changes		Cost	Impact On	
			✓ Minor Modification	✓ Major Change		Quality	Productivity
5. Bent wrists/repeated wrist movements or repeated forearm rotation	<ul style="list-style-type: none"> Hand manipulating dough and other ingredients 	149. Provide appropriate tools <ul style="list-style-type: none"> use powered food mixers for as many tasks as possible 11. Eliminate unnecessary tasks <ul style="list-style-type: none"> purchase ingredients already prepared and packaged to size 	✓		med	low	med
				✓	med	low	med

Hands/Wrists/Arms (Cont'd)

Job Factor	Potential Causes	Corrective Action	Level of Changes		Cost	Impact On	
			✓ Minor Modification	✓ Major Change		Quality	Productivity
6. Repeated manipulations with fingers	<ul style="list-style-type: none"> Hand manipulating dough and other ingredients 	149. Provide appropriate tools <ul style="list-style-type: none"> use powered food mixers for as many tasks as possible 	✓		med	low	med
		11. Eliminate unnecessary tasks <ul style="list-style-type: none"> purchase ingredients already prepared and packaged to size 		✓	med	low	med
		20. Incorporate rest pauses	✓		low	low	low
7. Hyper-extension of finger/thumb or repeated single finger activation	<ul style="list-style-type: none"> Cake decorating 	149. Provide appropriate tools <ul style="list-style-type: none"> use a dispenser that is triggered appropriately 		✓	low	low	med
		20. Incorporate rest pauses	✓		low	low	low
		13. Encourage ergonomic work techniques <ul style="list-style-type: none"> position hand to minimize holding the thumb or a finger away from the rest of the hand 	✓		low	low	low
	<ul style="list-style-type: none"> Using sifter 	149. Provide appropriate tools <ul style="list-style-type: none"> provide a tool that allows a comfortable hand position, particularly grip width. 		✓	low to med	low	low

Hands/Wrists/Arms (Cont'd)

Job Factor	Potential Causes	Corrective Action	Level of Changes		Cost	Impact On	
			✓ Minor Modification	✓ Major Change		Quality	Productivity
8. Hand/grip forces	<ul style="list-style-type: none"> Fingertip forces from prying apart pans that are stuck together 	128. Reduce force required to install or remove component	✓		low	low	med
		<ul style="list-style-type: none"> use a small wedge to separate pans use a spoon to perform the prying task 	✓		low	low	med
	<ul style="list-style-type: none"> Holding pans back too far on the handle 	13. Encourage ergonomic work techniques	✓		low	low	low
		<ul style="list-style-type: none"> choke up on handle to improve control of pan 					
	<ul style="list-style-type: none"> Hand manipulating dough and other ingredients 	94. Provide appropriate handles		✓	med	med	med
		<ul style="list-style-type: none"> provide handles that are insulated to prevent contact with hot surfaces. 					
		149. Provide appropriate tools	✓		med	low	med
		<ul style="list-style-type: none"> use powered food mixers for as many tasks as possible 					
		11. Eliminate unnecessary tasks		✓	med	low	med
		<ul style="list-style-type: none"> purchase ingredients already prepared and packaged to size 					

Hands/Wrists/Arms (Cont'd)

Job Factor	Potential Causes	Corrective Action	Level of Changes		Cost	Impact On	
			✓ Minor Modification	✓ Major Change		Quality	Productivity
9. High speed hand/wrist/arm movements or vibration, impact or torque to the hand	<ul style="list-style-type: none"> Tearing open ingredient boxes and bags 	13. Encourage ergonomic work techniques <ul style="list-style-type: none"> use a knife to open boxes and bags 	✓		low	med	med
		149. Provide appropriate tools <ul style="list-style-type: none"> provide a utility razor to open boxes and bags 	✓		low	med	med
10. Exposure to hard edges	<ul style="list-style-type: none"> Hard edges from handing trays, pans and utensils 	93. Provide appropriate gloves	✓		med	low	low
		9. Eliminate exposure to hard edges <ul style="list-style-type: none"> use pot holders to avoid exposure to hard edges 	✓		low	low	low
11. Hands and fingers exposed to cold temperatures	<ul style="list-style-type: none"> Working in freezers, working with cold ingredients 	93. Provide appropriate gloves <ul style="list-style-type: none"> provide insulated gloves covered by an outer layer of plastic 		✓	med	low	low

Back/Torso

Job Factor	Potential Causes	Corrective Action	Level of Changes		Cost	Impact On	
			✓ Minor Modification	✓ Major Change		Quality	Productivity
12. Repeated forward or sideways bending movements	<ul style="list-style-type: none"> Oven heights, mixer bowl heights and storage heights too low 	13. Encourage ergonomic work techniques <ul style="list-style-type: none"> use oven rack heights between mid-thigh and mid-chest height whenever possible 	✓		low	low	low
		124. Raise the work piece/work surface <ul style="list-style-type: none"> place frequently accessed and/or heavy ingredients on shelves between mid-thigh and chest height 	✓		low	low	low
		<ul style="list-style-type: none"> provide a small portable lift cart that will allow the mixer bowl to be lifted to table height 		✓	med	low	low
		148. Provide appropriate equipment <ul style="list-style-type: none"> install an oven with a vertical or horizontal rotisserie/carousel in order to minimize reaching and bending 		✓	high	low	med


Back/Torso (Cont'd)

Job Factor	Potential Causes	Corrective Action	Level of Changes		Cost	Impact On	
			✓ Minor Modification	✓ Major Change		Quality	Productivity
	<ul style="list-style-type: none"> Stacking items on low shelves of cart causes awkward bending Person tends to use the back to lift instead of using the legs to assist in the lift (check for contributing factor in the workplace) 	13. Encourage ergonomic work techniques <ul style="list-style-type: none"> use cart shelves between knee and shoulder heights whenever possible 	✓		low	low	low
		48. Provide a cart <ul style="list-style-type: none"> provide a cart that has spring loaded shelves (e.g., dish cart) or use a cart which has the bottom shelf removed 		✓	med	med	med
		13. Encourage ergonomic work techniques <ul style="list-style-type: none"> provide training on ergonomics principles and lifting techniques 	✓		low	low	low
		<ul style="list-style-type: none"> encourage person to use leg muscles to lift 	✓		low	low	low
		48. Provide a cart <ul style="list-style-type: none"> provide a cart that has spring loaded shelves (e.g., dish cart) or use a cart which has the bottom shelf removed 		✓	med	med	med

Back/Torso (Cont'd)

Job Factor	Potential Causes	Corrective Action	Level of Changes		Cost	Impact On	
			✓ Minor Modification	✓ Major Change		Quality	Productivity
13. Twisting of the lower back	<ul style="list-style-type: none"> Work area layout 	130. Reduce the angle a person has to turn to transfer an item	✓		low to high	low	med
		<ul style="list-style-type: none"> for example, if the transfer involves a 180 degree twist, move the source or destination to reduce the twist to 90 degrees or less reposition supplies/materials to reduce twisting 	✓		low to high	low	med
		13. Encourage ergonomic work techniques	✓		low	low	low
		<ul style="list-style-type: none"> provide training on ergonomics principles and lifting techniques encourage person to use legs to pivot when handling a load 	✓		low	low	low
14. High speed, sudden movements or Lifting awkward, uneven, shifting or bulky items.	<ul style="list-style-type: none"> Person tends to lift with a jerky motion instead of a smooth motion 	13. Encourage ergonomic work techniques	✓		low	low	low
		<ul style="list-style-type: none"> encourage person to use smooth fluid movements while handling items 	✓		low	low	med
		147. Provide an alternate container		✓	med	med	med
		<ul style="list-style-type: none"> contact vendor to request addition of handles or repackaging of contents to increase density 					

Back/Torso (Cont'd)

Job Factor	Potential Causes	Corrective Action	Level of Changes		Cost	Impact On	
			✓ Minor Modification	✓ Major Change		Quality	Productivity
15. Static, awkward back postures	<ul style="list-style-type: none"> Bending over scooping ingredients from mixer bowl 	124. Raise the work piece/work surface <ul style="list-style-type: none"> provide a small portable lift cart that will allow the mixer bowl to be lifted to table height 		✓	med	med	med
16. Lifting forces	<ul style="list-style-type: none"> Lifting full pans from the oven. Lifting ingredients from shelves. Lifting mixing bowls. 	4. Change a lifting/carrying task into a rolling or sliding task <ul style="list-style-type: none"> provide adjustable height carts which adjust to bench, shelf and oven heights to minimize lifting 		✓	med	med	med

Back/Torso (cont'd)

Job Factor	Potential Causes	Corrective Action	Level of Changes		Cost	Impact On	
			✓ Minor Modification	✓ Major Change		Quality	Productivity
	<ul style="list-style-type: none"> Lifting full pans from the oven. Lifting ingredients from shelves. Lifting mixing bowls. (continued) 	13. Encourage ergonomic work techniques <ul style="list-style-type: none"> encourage person to keep load as close to body as possible 11. Eliminate unnecessary tasks <ul style="list-style-type: none"> investigate bulk delivery of flour and other supplies 124. Raise the work piece/work surface <ul style="list-style-type: none"> provide a small portable lift cart that will allow the mixer bowl to be lifted to table height 	✓	✓ ✓ ✓	high high med	med med med	med med med
17. Pushing or pulling	<ul style="list-style-type: none"> Rolling/sliding resistance of cart or piece of equipment causes high forces Floor/surface condition causes high forces during a rolling or sliding task 	19. Improve wheel condition <ul style="list-style-type: none"> repair wheels on carts or equipment 119. Provide wheels <ul style="list-style-type: none"> provide wheels with appropriate bearings and tread composition 17. Improve floor condition <ul style="list-style-type: none"> improve housekeeping repair cracks or gaps in floor provide ramps to compensate for minor differences in floor height 	✓ ✓	✓ ✓ ✓	med med low high med	med med high med med	med med high med med

Back/Torso (cont'd)

Job Factor	Potential Causes	Corrective Action	Level of Changes		Cost	Impact On	
			✓ Minor Modification	✓ Major Change		Quality	Productivity
	<ul style="list-style-type: none"> Freezer door is difficult to open 	11. Eliminate unnecessary tasks <ul style="list-style-type: none"> replace freezer door with an air curtain 35. Maintain tracks, rollers, and movement mechanisms <ul style="list-style-type: none"> perform routine lubrication and maintenance on the freezer door to limit force requirements lubricate door hinges 		✓	high	low	med
			✓		med	low	med
			✓		low	low	med
18. Whole body vibration	<ul style="list-style-type: none"> Rarely occurs 	N/A					
19. Fixed position, standing	<ul style="list-style-type: none"> Prolonged standing 	52. Provide a footrail or footrest <ul style="list-style-type: none"> provide a footrest/footrail that allows the person to periodically raise one leg 		✓	low to med	low	med
20. Exposure to hard edges on legs, knees, and feet or Standing on hard surfaces	<ul style="list-style-type: none"> Standing on a hard surface 	86. Provide an appropriate anti-fatigue mat 96. Provide appropriate shoe inserts		✓ ✓	med med	low low	med med
21. Awkward leg postures	<ul style="list-style-type: none"> Rarely occurs 	N/A					
22. Awkward foot postures	<ul style="list-style-type: none"> Rarely occurs 	N/A					

Head/Eyes

Job Factor	Potential Causes	Corrective Action	Level of Changes		Cost	Impact On	
			✓ Minor Modification	✓ Major Change		Quality	Productivity
23. Difficult to see/light levels too low/too high		18. Improve visual access to work • Light levels should be 75fc to 125fc for work		✓	low	med	med
24. Intensive visual tasks, staring at work objects for long periods	• Cake decorating	20. Incorporate rest pauses	✓		low	low	low

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